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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,427	10/02/2003	Alan R. Arthur	200311615-1	1589

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EXAMINER	
ECHELMEYER, ALIX ELIZABETH	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 09/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/678,427	ARTHUR, ALAN R.	
	Examiner	Art Unit	
	Alix Elizabeth Echelmeyer	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) *28-40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-35 and 41-49* is/are rejected.

7)☒ Claim(s) *36-40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10-2-03* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10-3-05*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-27 and 41-49, drawn to a variably insulated system, classified in class 429, subclass 210.

   II. Claims 28-40, drawn to a method of operating the variably insulated system, classified in class 429, subclass 210.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the product as claimed can be used in a materially different process that does not require the limitation of claim 28 that thermal energy be applied to the heat generating core.

3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

4. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with David Collins (520) 399-3203 on September 6, 2006 a provisional election was made with traverse to prosecute the invention of Invention I, claims 1-27 and 41-49. Affirmation of this election must be made by applicant in replying to this Office action. Claims 28-40 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

6. Claims 36-40 are objected to because of the following informalities: they refer to the "system" of claims 28 or 39. Claims 28 and 39 are method claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-6, 9-16, 19-20, 41-43 and 45-49 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a variably insulated system for a fuel cell, does not reasonably provide enablement for a variably insulated system for any heat generating core. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to anticipate the invention commensurate in scope with these claims.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 2, 5, 7, 9, 11, 12, 15, 17, 19, 41, 45 and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Funakawa et al. (Japanese Publication 60-041769).

Funakawa et al. teach the cooling of a fuel cell using a metallic body, radiator plates, and bimetals (abstract).

Regarding claims 1, 7, 11, 17 and 41, the heat generating core is a fuel cell; claims 9, 19 and 45, the heat sink is the metallic radiator plate; and claims 5, 15 and 48, the coupling member is the U-shaped bimetallic strips.

As for claims 2 and 12, the bimetallic strips change shape at a certain temperature of the fuel cell to contact the first heat sink, the metallic body, to the radiator plates. This temperature is predetermined by the properties of the bimetal.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 3, 4, 13, 14 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Watanabe (US Pre-Grant Publication 2004/0067398).

The teachings of Funakawa et al. as discussed above are incorporated herein.

Funakawa et al. teach a coupling member to selectively attach a fuel cell to a heat sink, but fail to teach that the coupling member is a shape memory alloy or a shape memory alloy coupled to a spring.

Watanabe teaches a heat sink for a cooling a power generation cell, where the angle and placement of the heat sink is controlled by a spring made of a shape memory alloy (Figures 3a, 3b; [0028]). The changeability of the heat sink provides temperature control for the system ([0006]).

It would be advantageous to use the shape memory alloy spring of Watanabe for the coupling member of Funakawa et al. since it would allow greater control of temperature by allowing the heat sink to be positioned in different ways depending on the temperature affecting the shape memory alloy spring.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the shape memory alloy spring of Watanabe in the system of Funakawa et al. to have greater control of temperature.

14. Claims 6, 16 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Saloka et al. (US Pre-Grant Publication 2003/0072984).

The teachings of Funakawa et al. as discussed above are incorporated herein.

Funakawa et al. teach a coupling member to selectively attach a fuel cell to a heat sink, but fail to teach that the coupling member is a machine actuated sensor member and a sensor.

Saloka et al. teach a heat exchanger coupled to a fuel cell, as well as a controller to control the operation of the fuel cell system (abstract; Figure 1). The controller communicates with a temperature sensor in the fuel cell, and when the fuel cell is below a certain temperature, the heat exchanger is bypassed ([0031]).

It would be advantageous to use the coupling mechanism of Saloka et al. in the system of Funakawa et al. because it takes measurements of the temperature of the fuel cell and communicates with the actuator, while the bimetal of Funakawa is not machine controlled. The coupling of Saloka et al. would be more precise.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the sensor-controller coupling of Saloka et al. in the insulating system of Funakawa et al. in order to better control the coupling member.

15. Claims 10, 20 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Peterson et al. (US Patent 6,634,890).

The teachings of Funakawa et al. as discussed above are incorporated herein.

Funakawa et al. teach a heat generating core coupled with a heat sink, but fail to teach the heat sink being made of aluminum or copper.

Peterson et al. teach a heat sink for a heat generating circuit assembly (abstract). The heat sink is made of a conductive metal, such as aluminum or copper, to dissipate the heat generated by the circuit assembly (column 2 lines 33-44).

It would be desirable to use aluminum or copper as a heat sink because these materials are known to be highly conductive, which would make them highly effective in dissipating heat.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use materials such as copper or aluminum, as taught by Peterson et al., as the heat sink in Funakawa et al. since highly conductive materials would be most effective at dissipating heat.

16. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Maeda et al. (US Pre-Grant Publication 2001/0023591).

The teachings of Funakawa et al. as discussed above are incorporated herein.

Funakawa et al. teach a heat sink for cooling a fuel cell but fail to teach the use of a fan for dissipating heat.

Maeda et al. teach a heat sink for cooling the heat generating CPU of a notebook computer. Additionally, a fan is used to cool the heat sink, creating a greater temperature differential between the heat sink and the CPU, making it cool more effectively (abstract; Figure 8; [0014]; [0016]).

It would be desirable to use the fan of Maeda et al. in the heat sink of Funakawa et al. in order to more effectively cool the fuel cell.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a fan to cool the heat sink of Funakawa et al.

further, as taught by Maeda et al., since the fan would make the heat sink more effective in removing heat from the fuel cell.

17. Claims 8, 18, 21, 22, 24, 26 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Gillett et al. (US Patent 5,759,278).

The teachings of Funakawa et al. as discussed above are incorporated herein.

Funakawa teaches a variably insulated system for a fuel cell but does not specifically teach a solid oxide fuel cell.

Gillett et al. teach a solid oxide fuel cell capable of operating at temperatures over 650°C (abstract; column 2 lines 46-66). The solid oxide fuel cell is contained within insulating housing to control the temperature, resulting in cost and performance advantages.

The insulating system of Funakawa et al. would further improve the advantages of Gillett et al. but allowing more control over the insulating system, since combining the system of Gillett et al. with the additional radiator plates taught by Funakawa et al. would provide added insulation.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the insulating system of Funakawa et al. with the solid oxide fuel cell system of Gillett et al. in order to improve the insulating housing already present in Gillett et al.

18. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view Gillett et al. as applied to claim 21 above and in further view of Watanabe (US Pre-Grant Publication 2004/0067398).

The teachings of Funakawa et al. and Gillett et al. as discussed above are incorporated herein.

Funakawa et al. in view of Gillett et al. teach a coupling member to selectively attach a solid oxide fuel cell to a heat sink, but fail to teach that the coupling member is a shape memory alloy or a shape memory alloy coupled to a spring.

Watanabe teaches a heat sink for a cooling a power generation cell, where the angle and placement of the heat sink is controlled by a spring made of a shape memory alloy (Figures 3a, 3b; [0028]). The changeability of the heat sink provides temperature control for the system ([0006]).

It would be advantageous to use the shape memory alloy spring of Watanabe for the coupling member of Funakawa et al. since it would allow greater control of temperature by allowing the heat sink to be positioned in different ways depending on the temperature affecting the shape memory alloy spring.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the shape memory alloy spring of Watanabe in the system of Funakawa et al. in view of Gillett to have greater control of temperature.

19. Claims 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Gillett et al. as applied to claim 21 above and in further view of Saloka et al. (US Pre-Grant Publication 2003/0072984).

The teachings of Funakawa et al. and Gillett et al. as discussed above are incorporated herein.

Funakawa et al. in view of Gillett et al. teach a coupling member to selectively attach a solid oxide fuel cell to a heat sink, but fail to teach that the coupling member is a machine actuated sensor member and a sensor.

Saloka et al. teach a heat exchanger coupled to a fuel cell, as well as a controller to control the operation of the fuel cell system (abstract; Figure 1). The controller communicates with a temperature sensor in the fuel cell, and when the fuel cell is below a certain temperature, the heat exchanger is bypassed ([0031]).

It would be advantageous to use the coupling mechanism of Saloka et al. in the system of Funakawa et al. in view of Gillett et al. because it takes measurements of the temperature of the fuel cell and communicates with the actuator, while the bimetal of Funakawa is not machine controlled. The coupling of Saloka et al. would be more precise.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the sensor-controller coupling of Saloka et al. in the insulating system of Funakawa et al. in view of Gillett et al. in order to better control the coupling member.

20. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funakawa et al. in view of Gillett et al. as applied to claim 21 above and in further view of Peterson et al. (US Patent 6,634,890).

The teachings of Funakawa et al. and Gillett et al. as discussed above are incorporated herein.

Funakawa et al. in view of Gillett et al. teach a heat generating core coupled with a metallic heat sink for cooling a solid oxide fuel cell, but fail to teach the heat sink being made of aluminum or copper.

Peterson et al. teach a heat sink for a heat generating circuit assembly (abstract). The heat sink is made of a conductive metal, such as aluminum or copper, to dissipate the heat generated by the circuit assembly (column 2 lines 33-44).

It would be desirable to use aluminum or copper as a heat sink because these materials are known to be highly conductive, which would make them highly effective in dissipating heat.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use materials such as copper or aluminum, as taught by Peterson et al., as the heat sink in Funakawa et al. in view of Gillett et al. since highly conductive materials would be most effective at dissipating heat.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

aee

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PRIMARY EXAMINER